

# Operating Instructions

Radiation-based sensor for level  
detection

## POINTRAC 31

Foundation Fieldbus



Document ID: 41779



# VEGA

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**Safety instructions for Ex areas**

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

Editing status: 2013-11-11

# 1 About this document

## 1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

## 1.2 Target group

This operating instructions manual is directed to trained specialist personnel. The contents of this manual should be made available to these personnel and put into practice by them.

## 1.3 Symbolism used



### Information, tip, note

This symbol indicates helpful additional information.



**Caution:** If this warning is ignored, faults or malfunctions can result.

**Warning:** If this warning is ignored, injury to persons and/or serious damage to the instrument can result.

**Danger:** If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.



### Ex applications

This symbol indicates special instructions for Ex applications.



### List

The dot set in front indicates a list with no implied sequence.



### Action

This arrow indicates a single action.



### Sequence of actions

Numbers set in front indicate successive steps in a procedure.



### Battery disposal

This symbol indicates special information about the disposal of batteries and accumulators.

## 2 For your safety

### 2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

### 2.2 Appropriate use

The POINTRAC 31 is a sensor for point level detection.

You can find detailed information on the application range in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

### 2.3 Warning about incorrect use

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

### 2.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and guidelines. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for the trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed by the user.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

The safety approval markings and safety tips on the device must also be observed.

This measuring system uses gamma rays. Therefore take note of the instructions for radiation protection in chapter "*Product description*". All work on the source container may only be carried out under the supervision of a qualified radiation protection officer.

## 2.5 CE conformity

The device fulfills the legal requirements of the applicable EC guidelines. By affixing the CE marking, VEGA confirms successful testing of the product.

### **Only with class A instruments:**

The device is a class A instrument designed for use in an industrial environment. When used in a different environment, e.g., in a living area, the electromagnetic compatibility must be ensured by the user. If necessary, suitable screening measures against conducted and emitted disturbances must be taken.

You can find the conformity certificate in the download section under [www.vega.com](http://www.vega.com).

## 2.6 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfills the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for malfunction information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components
- NE 107 – Self-monitoring and diagnosis of field devices

For further information see [www.namur.de](http://www.namur.de).

## 2.7 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

## 3 Product description

### 3.1 Configuration

#### Type plate

The nameplate contains the most important data for identification and use of the instrument:

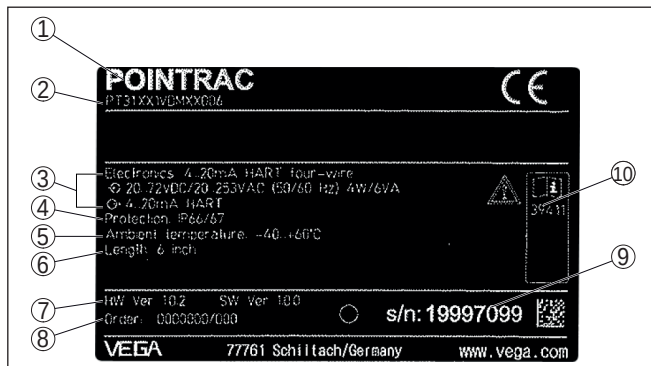


Fig. 1: Layout of the type label (example)

- 1 Instrument type
- 2 Product code
- 3 Electronics
- 4 Protection rating
- 5 Process and ambient temperature, process pressure
- 6 Instrument length
- 7 Hardware and software version
- 8 Order number
- 9 Serial number of the instrument
- 10 ID numbers, instrument documentation

#### Serial number

The type label contains the serial number of the instrument. With it you can find the following data on our homepage:

- Product code of the instrument (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions at the time of shipment (PDF)
- Order-specific sensor data for an electronics exchange (XML)
- Test certificate pressure transmitters (PDF)

Go to [www.vega.com](http://www.vega.com), "VEGA Tools" and "Serial number search".

As an alternative, you can find the data via your Smartphone:

- Download the smartphone app "VEGA Tools" from the "Apple App Store" or the "Google Play Store"
- Scan the Data Matrix code on the type label of the instrument or
- Enter the serial number manually in the app

#### Scope of this operating instructions manual

This operating instructions manual applies to the following instrument versions:

- Hardware from 1.0.4
- Software from 1.5.0

- Modification status, electronics as of -01

## Electronics versions

The instrument is available in different electronics versions. Each version can be identified via the product code on the type label:

- Standard electronics type PT30E-XX

## Scope of delivery

The scope of delivery encompasses:

- Radiation-based sensor
- Mounting accessory
- Documentation
  - this operating instructions manual
  - Operating instructions manual "*Display and adjustment module*" (optional)
  - Ex-specific "*Safety instructions*" (with Ex versions)
  - if necessary, further certificates

## 3.2 Principle of operation

### Application area

The instrument is suitable for applications in liquids and bulk solids in vessels under difficult process conditions. There are application possibilities in nearly all areas of industry.

The limit level is detected contactlessly through the vessel wall. Neither a process fitting nor a vessel opening is required. The instrument is thus ideal for retrofitting.

### Functional principle

In radiation-based measurement, a Caesium-137 or Cobalt-60 isotope emits focussed gamma rays that are attenuated when penetrating the vessel wall and the medium. The PVT detector on the opposite side of the tank receives the radiation. When the intensity of the radiation drops below a defined value, e.g. due to damping, then the POINTRAC 31 switches. The measuring principle has proven itself well under extreme conditions because it measures contactlessly from outside through the vessel wall. The measuring system ensures maximum safety, reliability and plant availability independent of the medium and its properties.

## 3.3 Packaging, transport and storage

### Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test based on ISO 4180.

The packaging of standard instruments consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

### Transport

Transport must be carried out in due consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

## Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

## Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

## Storage and transport temperature

- Storage and transport temperature see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 ... 85 %

## 3.4 Accessories and replacement parts

### PLICSCOM

The display and adjustment module PLICSCOM is used for measured value indication, adjustment and diagnosis. It can be inserted into the sensor or the external display and adjustment unit and removed at any time.

You can find further information in the operating instructions "*Display and adjustment module PLICSCOM*" (Document-ID 27835).

### VEGACONNECT

The interface adapter VEGACONNECT enables the connection of communication-capable instruments to the USB interface of a PC. For parameter adjustment of these instruments, the adjustment software PACTware with VEGA-DTM is required.

You can find further information in the operating instructions "*Interface adapter VEGACONNECT*" (Document-ID 32628).

### VEGADIS 81

The VEGADIS 81 is an external display and adjustment unit for VEGA plics® sensors.

For sensors with double chamber housing the interface adapter "*DIS-ADAPT*" is also required for VEGADIS 81.

You can find further information in the operating instructions "*VEGADIS 81*" (Document-ID 43814).

## Electronics module

The electronics module PT30E.XX is a replacement part for radiation-based sensors POINTRAC 31.

The electronics module can only be exchanged by VEGA service technician.

## 3.5 Corresponding source container

A radioactive isotope in a suitable source holder is the prerequisite for a radiation-based measurement setup.

The handling of radioactive substances is regulated by law. The radiation protection rules of the country in which the system is operated apply first and foremost.

In Germany, for example, the current radiation protection ordinance (StrlSchV) based on the Atomic Energy Law (AtG) applies.

The following points are important for measurement with radiation-based methods:

### Handling permit

A handling permit is required for operation of a system using gamma rays. This permit is issued by the respective government office or the responsible authority (in Germany, for example, offices for environmental protection, trade supervisory boards, etc.)

You can find further instructions in the operating instructions manual of the source container.

### General instructions for radiation protection

When handling radioactive sources, unnecessary radiation exposure must be avoided. An unavoidable radiation exposure must be kept as low as possible. Take note of the following three important measures:

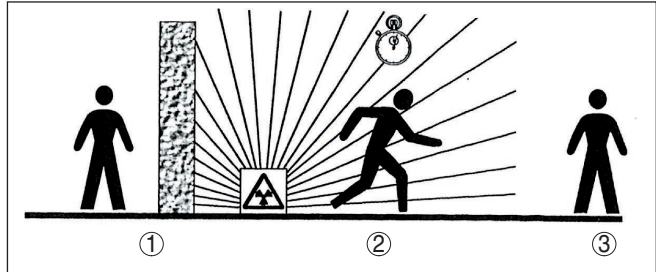


Fig. 2: Measures for protection against radioactive radiation

- 1 Shielding
- 2 Time
- 3 Distance

**Shielding:** Provide good shielding between the radioactive source and yourself as well as all other persons. Special source containers (e.g. VEGASOURCE) as well as all materials with high density (e.g. lead, iron, concrete, etc.) provide effective shielding.

**Time:** Stay as short a time as possible in radiation exposed areas.

**Distance:** Your distance to the source should be as large as possible. The local dose rate of the radiation decreases in proportion to the square of the distance to the radiation source.

### Radiation safety officer

The plant operator must appoint a radiation safety officer with the necessary expert knowledge. He is responsible that the radiation protection ordinance is maintained and that all radiation protection measures are implemented.

### Control area

Control areas are areas in which the local dose rate exceeds a certain value. Only persons who undergo official dose monitoring are allowed into these control areas. You can find the respectively valid limit values

for control areas in the guideline of the respective authority (in Germany, for example, the radiation protection ordinance).

We are at your disposal for further information concerning radiation protection and regulations in other countries.

## 4 Mounting

### 4.1 General instructions

#### Switch off source

The source container is part of the measuring system. In case the source container is already equipped with an active isotope, the source container must be locked before mounting.



#### **Danger:**

Before mounting; make sure that the source is securely closed. Use a padlock to secure the source container in the closed condition and prevent it from being inadvertently opened.

#### Protection against moisture

Protect your instrument against moisture penetration through the following measures:

- Use the recommended cable (see chapter "*Connecting to power supply*")
- Tighten the cable gland
- Loop the connection cable downward in front of the cable gland

This applies particularly to:

- Outdoor mounting
- Installations in areas where high humidity is expected (e.g. through cleaning processes)
- Installations on cooled or heated vessels

#### Suitability for the process conditions

Make sure that all parts of the instrument exposed to the process are suitable for the existing process conditions.

These are mainly:

- Active measuring component
- Process fitting
- Process seal

Process conditions are particularly:

- Process pressure
- Process temperature
- Chemical properties of the medium
- Abrasion and mechanical influences

You can find the specifications of the process conditions in chapter "*Technical data*" as well as on the nameplate.

#### Protective caps

In the case of instrument housings with self-sealing NPT threads, it is not possible to have the cable entries screwed in at the factory. The openings for the cable glands are therefore covered with red protective caps as transport protection.

Prior to setup you have to replace these protective caps with approved cable glands or close the openings with suitable blind plugs.

The suitable cable glands and blind plugs come with the instrument.

## 4.2 Mounting instructions

### Installation position



#### Note:

Along with the planning, our specialists will analyse the conditions of the measurement loop to dimension the radiation source (isotope) accordingly.

You get a "Source Sizing" document specifying the required source activity and containing all relevant mounting information for your measuring point.

You must follow the instructions of this "Source Sizing" document in addition to the following mounting instructions.

The following mounting information is applicable as long as there is nothing else specified in the "Source Sizing" document.

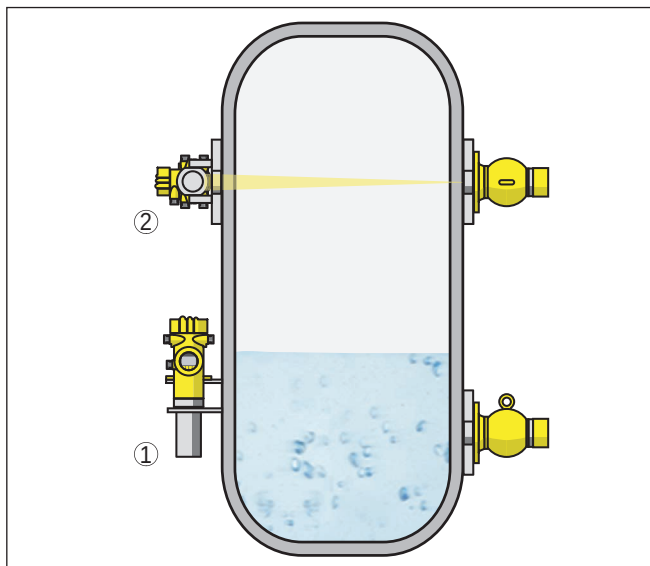


Fig. 3: Mounting position - level detection

- 1 Vertical mounting
- 2 Mounting horizontally, at right angles to container

You can find information on protective barriers and the mounting of the corresponding source container in the operating instructions manual of the source container, e.g. VEGASOURCE.

For level detection, the sensor is generally mounted horizontally at the height of the requested limit level. Make sure that there are no struts or reinforcements at this position in the vessel.

Direct the exit beam of the source container exactly towards the measuring range of POINTRAC 31.

Fasten the sensor in such a way that it cannot fall out of the holder. If necessary, provide the sensor with a support from below.

Mount the source container and POINTRAC 31 as close as possible to the vessel. If there are gaps, secure the area with a safety fence

and protective grating so that no one can reach into the dangerous area.

### Sensor orientation

#### Level detection - max. detection

The POINTRAC 31 is suitable for level detection in liquids or bulk solids. It is mounted at the height of the requested switching point.

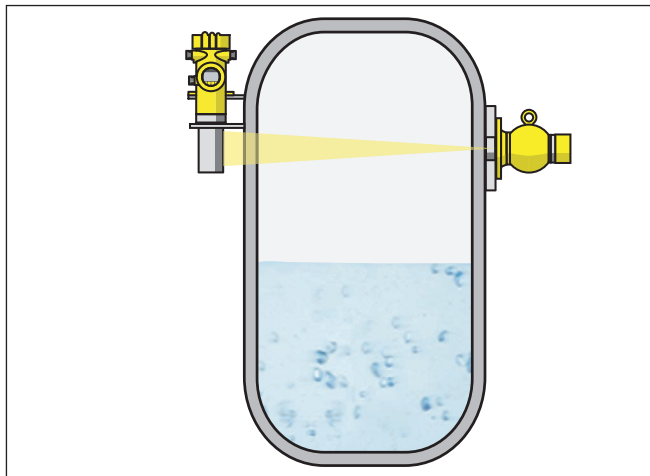


Fig. 4: POINTRAC 31 as max. level detection (uncovered)

#### Level detection - min. detection

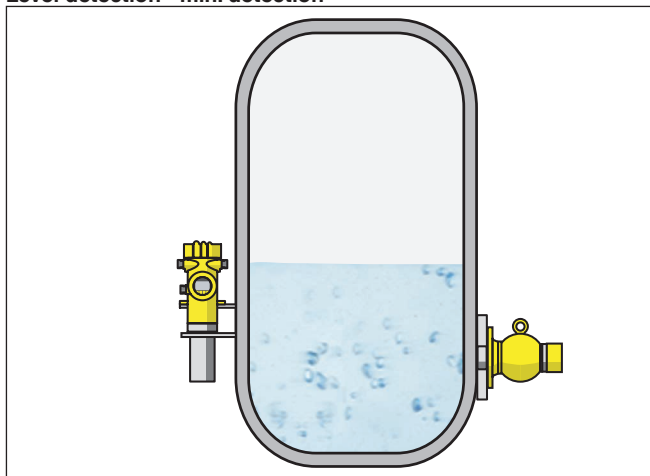


Fig. 5: POINTRAC 31 as min. level detection (covered)

## Bulk solids with low density

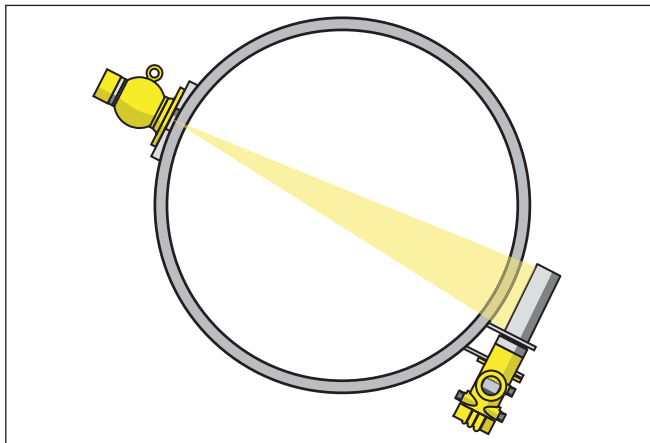


Fig. 6: POINTRAC 31 as level detection (top view)

POINTRAC 31 lends itself well for level detection of bulk solids with low density. Mount the instrument horizontally at the height of the requested switching point.

Mount the source container VEGASOURCE displaced by 90° in order to get the widest possible radiation angle.

When the sensor is covered by the medium, the radiation damping is considerably stronger - hence, the switching point is all the more reliable.

## Protection against heat

If the max. ambient temperature is exceeded, you must take suitable measures to protect the instrument against overheating.

You can protect the instrument by providing a suitable insulation against the heat or mounting the instrument further away from the heat source.

Make sure these measures are taken into account already in the planning stage. If you want to carry out such measures later on, contact our specialists to ensure that the accuracy of the application is not impaired.

If these measures are not sufficient to maintain the max. ambient temperature, you could consider using the water cooling system we offer for POINTRAC 31.

The water cooling must also be included in the calculations for the measuring point. Contact our specialists regarding the dimensioning of the water cooling.

## 5 Connecting to power supply

### 5.1 Preparing the connection

#### Safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed

#### Voltage supply

Power supply and digital bus cable via separate two-wire connection cables. Power is supplied via the H1 voltage supply.

#### Connection cable

Connection is carried out with screened cable according to Fieldbus specification.

Use cable with round cross-section. A cable outer diameter of 5 ... 9 mm (0.2 ... 0.35 in) ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.

Make sure that the entire installation is carried out according to the Fieldbus specification. In particular, make sure that the bus is terminated with suitable terminating resistors.

#### Cable entry

Generally provide all unused cable entries with suitable blind plugs. The thin foam rubber washers in the cable glands only serve as a dust cover during transport.

#### Cable gland ½ NPT

In the case of instrument housings with self-sealing NPT threads, it is generally not possible to have the cable glands screwed in at the factory. The openings for the cable glands are therefore covered with red protective caps as transport protection.

Before setup you have to replace these protective caps with approved cable glands or close the openings with suitable blind plugs. Unused cable glands do not provide sufficient protection against moisture and must be replaced with blind plugs.

The suitable cable glands and blind plugs come with the instrument.

#### Cable screening and grounding

Make sure that the cable screening and ground is executed according to the Fieldbus specification. If electromagnetic interference is expected which is above the test values of EN 61326-1 for industrial areas, we recommend to connect the cable screen on both ends to ground potential.

In systems with potential equalisation, connect the cable screen directly to ground potential at the power supply unit, in the connection box and at the sensor. The screen in the sensor must be connected directly to the internal ground terminal. The ground terminal outside on the housing must be connected to the potential equalisation (low impedance).

In systems without potential equalisation with cable screening on both sides, connect the cable screen directly to ground potential at the power supply unit and at the sensor. In the connection box or

T-distributor, the screen of the short stub to the sensor must not be connected to ground potential or to another cable screen. The cable screens to the power supply unit and to the next distributor must be connected to each other and also connected to ground potential via a ceramic capacitor (e.g. 1 nF, 1500 V). Low-frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

### Connection technology

The voltage supply and signal output are connected via the spring-loaded terminals in the housing.

The connection to the display and adjustment module or to the interface adapter is carried out via contact pins in the housing.

### Connection procedure

Proceed as follows:

The procedure applies to instruments without explosion protection.

1. Unscrew the big housing cover
2. Loosen compression nut of the cable entry
3. Remove approx. 10 cm (4 in) of the cable mantle, strip approx. 1 cm (0.4 in) of insulation from the ends of the individual wires
4. Insert the cable into the sensor through the cable entry

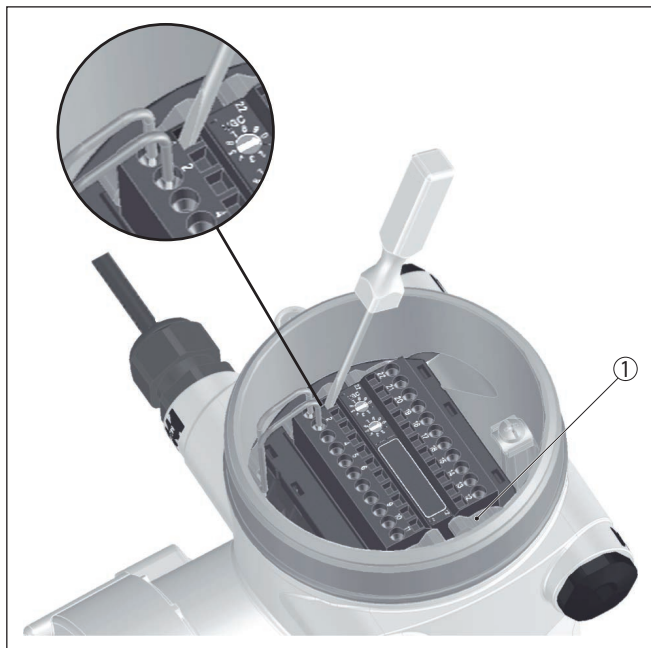


Fig. 7: Connection steps 4 and 5

1 Locking of the terminal blocks

5. Insert a small slotted screwdriver firmly into the rectangular lock openings of the respective connection terminal

6. Insert the wire ends into the round openings of the terminals according to the wiring plan

**Information:**

Solid cores as well as flexible cores with cable end sleeves are inserted directly into the terminal openings. In case of flexible cores without end sleeves, press the rectangular lock opening with a small screwdriver; the terminal opening is freed. When the screwdriver is released, the terminal opening closes again.

7. Check the hold of the wires in the terminals by lightly pulling on them

To loosen a line, insert a small slotted screwdriver firmly into the rectangular locking opening according to the illustration

8. Connect the screen to the internal ground terminal, connect the outer ground terminal to potential equalisation
9. Tighten the compression nut of the cable entry gland. The seal ring must completely encircle the cable
10. Screw the housing cover back on

The electrical connection is hence finished.

**Information:**

The terminal blocks are pluggable and can be detached from the electronics. For this purpose loosen the two lateral locking levers of the terminal block with a small screwdriver. When loosening the locking, the terminal block is automatically squeezed out. It must snap in place when re-inserted.

## 5.2 Connection

### Non-Ex instruments and instruments with non-intrinsically safe current output

Electronics and connection compartment - Non-Ex instruments and instruments with non-intrinsically safe current output

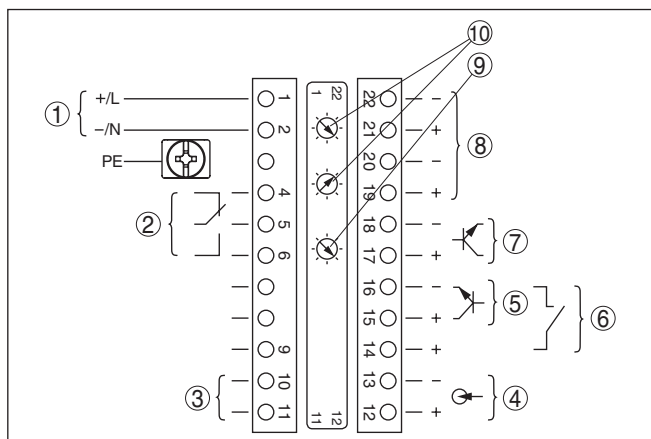


Fig. 8: Electronics and connection compartment with non-Ex instruments and instruments with non-intrinsically safe current output

- 1 Voltage supply
- 2 Relay output
- 3 Signal output FF bus
- 4 Signal input 4 ... 20 mA (active sensor)
- 5 Switching input for NPN transistor
- 6 Switching input floating
- 7 Transistor output
- 8 Interface for sensor-sensor communication (MGC)
- 9 Simulation switch (1 = simulation on)
- 10 Setting the bus address for sensor-sensor communication (MGC)<sup>1)</sup>

Adjustment and connection compartment - Non-Ex instruments and instruments with non-intrinsically safe current output

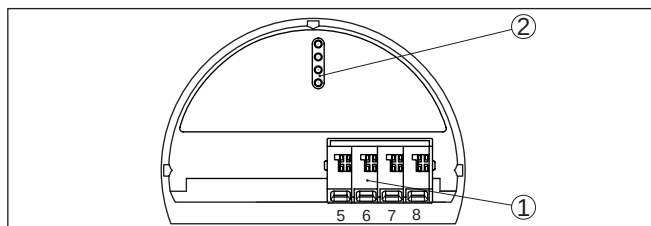


Fig. 9: Adjustment and connection compartment with non-Ex instruments and instruments with non-intrinsically safe current output

- 1 Terminals for the external display and adjustment unit
- 2 Contact pins for the display and adjustment module or interface adapter

### Instruments with intrinsically safe current output



You can find detailed information on the explosion-protected versions (Ex-ia, Ex-d) in the Ex-specific safety instructions. These safety

<sup>1)</sup> MGC = Multi Gauge Communication

instructions are part of the scope of delivery and come with the Ex-approved instruments.

### Electronics and connection compartment - Instruments with intrinsically safe current output

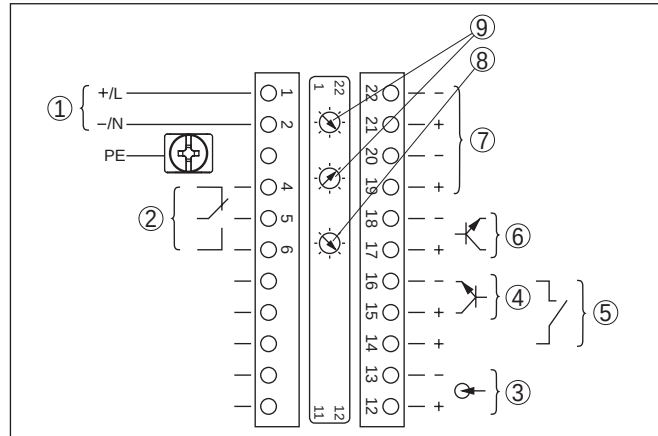


Fig. 10: Electronics and connection compartment (Ex-d) with instruments with intrinsically safe current output

- 1 Voltage supply
- 2 Relay output
- 3 Signal input 4 ... 20 mA (active sensor)
- 4 Switching input for NPN transistor
- 5 Switching input floating
- 6 Transistor output
- 7 Interface for sensor-sensor communication (MGC)
- 8 Simulation switch (1 = simulation on)
- 9 Setting the bus address for sensor-sensor communication (MGC)<sup>2)</sup>

### Adjustment and connection compartment - Instruments with intrinsically safe current output

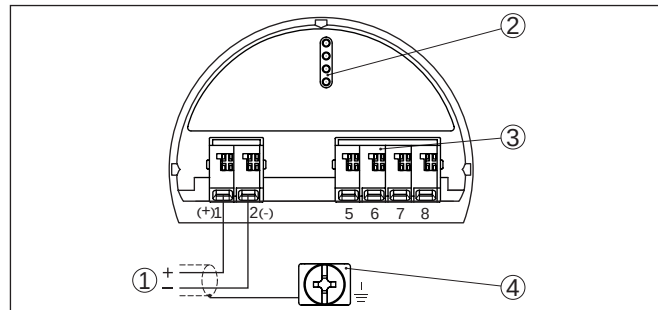


Fig. 11: Adjustment and connection compartment (Ex-ia) with instruments with intrinsically safe current output

- 1 Terminals for intrinsically safe signal output FF bus
- 2 Contact pins for the display and adjustment module or interface adapter
- 3 Terminals for the external display and adjustment unit
- 4 Ground terminal

<sup>2)</sup> MGC = Multi Gauge Communication

## 6 Set up with the display and adjustment module

### Mount/Dismount display and adjustment module

#### 6.1 Insert display and adjustment module

The display and adjustment module can be inserted into the sensor and removed again at any time. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the small housing cover
2. Place the display and adjustment module in the desired position on the electronics (you can choose any one of four different positions - each displaced by 90°)
3. Press the display and adjustment module onto the electronics and turn it to the right until it snaps in.
4. Screw housing cover with inspection window tightly back on

Removal is carried out in reverse order.

The display and adjustment module is powered by the sensor, an additional connection is not necessary.

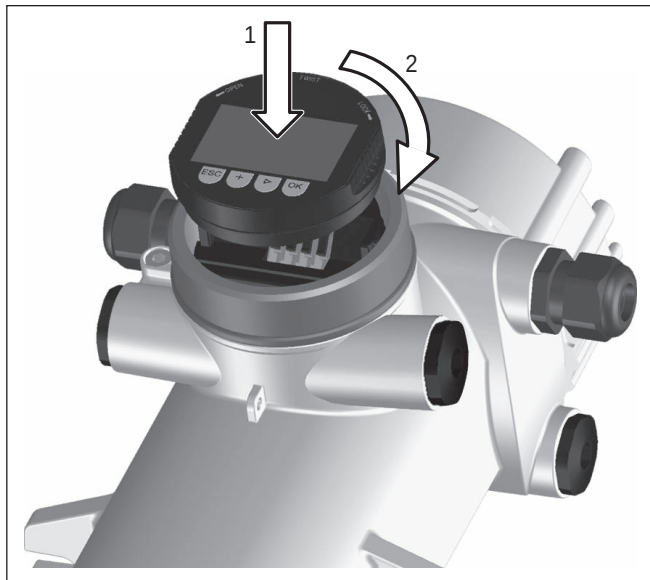


Fig. 12: Insert display and adjustment module



#### Note:

If you intend to retrofit the instrument with a display and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.

## 6.2 Adjustment system

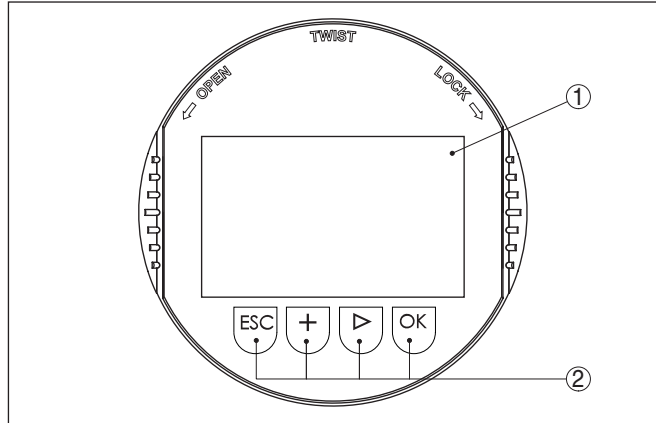


Fig. 13: Display and adjustment elements

- 1 LC display
- 2 Adjustment keys

### Key functions

- **[OK]** key:
  - Move to the menu overview
  - Confirm selected menu
  - Edit parameter
  - Save value
- **[-]** key:
  - Presentation, change measured value
  - Select list entry
  - Select editing position
- **[+]** key:
  - Change value of the parameter
- **[ESC]** key:
  - Interrupt input
  - Jump to next higher menu

### Adjustment system

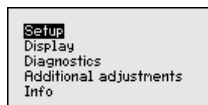
The device is adjusted via the four keys of the display and adjustment module. The LC display indicates the individual menu items. The functions of the individual keys are shown in the above illustration. Approx. 60 minutes after the last pressing of a key, an automatic reset to measured value indication is triggered. Any values not confirmed with **[OK]** will not be saved.

## 6.3 Parameter adjustment

The instrument is adapted to the application conditions via the parameter adjustment. The parameter adjustment is carried out with an adjustment menu.

### Main menu

The main menu is divided into five sections with the following functions:



**Setup:** Settings, e.g. for measurement loop name, isotope, application, background radiation, adjustment, signal output

**Display:** Settings, for example language, measured value display

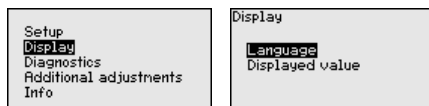
**Diagnosis:** Information, for example, of device status, peak value, simulation

**Additional adjustments:** Instrument unit, reset, date/time, copying function

**Info:** Instrument name, hardware and software version, date of manufacture, instrument features

### Procedure

Check if the correct language is already set for the display. If not, you can change the language in the menu item "Display/Language".



Start with the setup of POINTRAC 31.

In the main menu point "Setup", the individual submenu points should be selected one after the other and provided with the correct parameters to ensure optimum adjustment of the measurement. The procedure is described in the following.

Stick with the normal sequence of the menu items as closely as possible.

### Setup

#### Setup - Isotope

In this menu item you can adjust the POINTRAC 31 to the integrated isotope in the source container.

For this purpose, check which isotope is integrated in the source container. You can find this information on the type label of the source container.



Through this selection, the sensitivity of the sensor is adapted perfectly to the isotope. The normal reduction of the emitter activity is hence considered through the radioactive decay.

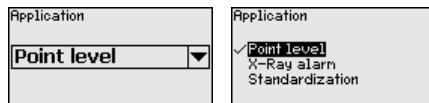
The POINTRAC 31 requires this information of the automatic decay compensation. This ensures an interference-free measurement over the complete life time of the gamma emitter - an annual recalibration is not necessary.

Enter the requested parameters via the appropriate keys, save your settings with **[OK]** and jump to the next menu item with the **[ESC]** and the **[→]** key.

### Setup - Application

Enter here, the respective application.

This menu item enables adaptation of the sensor to the requested application. You can choose between the following applications: "Level", "Point level" or "Summation Slave".



### Setup - Background radiation

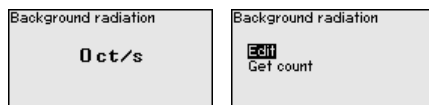
The natural radiation on earth influences the accuracy of the measurement.

With this menu item the natural background radiation can be faded out.

For this purpose, the POINTRAC 31 measures the natural background radiation and sets the pulse rate to zero.

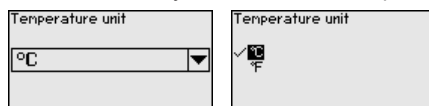
In the future, the pulse rate from this background radiation will be automatically deducted from the total pulse rate. This means: only the component of the pulse rate originating from the source will be displayed.

The source container must be closed for this setting.



### Setup - Unit

In this menu item you can select the temperature unit.



### Setup - Adjustment mode

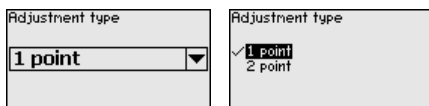
In this menu item you can select if you want to carry out a single or double point adjustment on the sensor.

With the double point adjustment, the Delta I value is selected automatically.

We recommend selecting the double point adjustment. To use this, you must be able to change the level of the vessel so as to carry out the adjustment of the sensor with full status (covered) and with empty status (uncovered).

Hence, you will get a very reliable switching point.

With single point adjustment, you have to define the difference between the min. and max. adjustment points (Delta I) yourself during the following setup.



### Setup - Adjustment uncovered (single point adjustment)

This menu item appears only if you have selected **"Single point adjustment"** as adjustment mode (Setup/Adjustment mode).

In this menu item you determine the point at which the POINTRAC 31 should switch in uncovered status.

Empty the vessel until the sensor is uncovered.

For this enter the requested pulse rate manually or let the rate be determined by POINTRAC 31. Automatic determination of the pulse rate should be given preference.

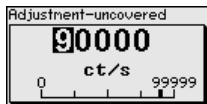
The pulse rate is entered in ct/s. This is the number of counts per second, i.e. the measured gamma radiation reaching the sensor.

Prerequisites:

- Radiation is switched on - Source container is set to "ON"
- There is no medium between source container and sensor



You can enter the value for "Adjustment uncovered" (ct/s) manually.



You can have the value for "Adjustment uncovered" determined by POINTRAC 31.



### Setup - Delta I (single point adjustment)

This menu item appears only if you have selected **"Single point adjustment"** as adjustment mode (Setup/Adjustment mode).

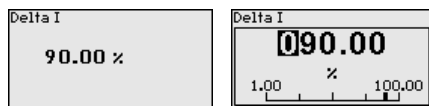
In this menu item you can adjust at which percentage value of the max. pulse rate the sensor should switch over.

Since in most cases the radiation is almost completely absorbed when the sensor is covered, the pulse rate when the sensor is covered is very low.

The change between the two statuses is sufficiently clear.

Hence a percentage value of 90 % for the Delta I value is recommended.

You select lower values for sensitive detection of material cones or buildup which cause only partial absorption of the radiation.



### Adjustment "covered" (two-point adjustment)

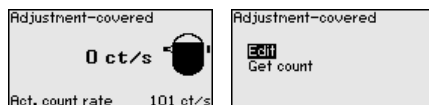
This menu item appears only if you have selected under adjustment mode (setup/adjustment mode) the **"Two-point adjustment"**.

In this menu item you can set the min. pulse rate (ct/s) at which the sensor should switch over.

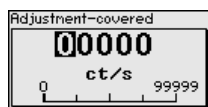
Fill the vessel until the POINTRAC 31 is covered.

You thus get the min. pulse rate (ct/s) for the "covered" adjustment.

Enter the requested pulse rate manually or let the rate be determined by POINTRAC 31. Automatic determination of the pulse rate should be given preference.



You can enter the adjustment point (ct/s) manually.



You can let the adjustment point be determined by POINTRAC 31.



### Adjustment "uncovered" (two-point adjustment)

This menu item appears only if you have selected under adjustment mode (setup/adjustment mode) the **"Two-point adjustment"**.

In this menu item you can set the max. pulse rate (ct/s) at which the sensor should switch over.

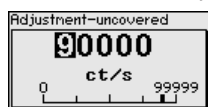
Empty the vessel until the POINTRAC 31 is uncovered.

You thus get the max. pulse rate (ct/s) for the "uncovered" adjustment.

Enter the requested pulse rate manually or let the rate be determined by POINTRAC 31. Automatic determination of the pulse rate should be given preference.



You can enter the adjustment point (ct/s) manually.



You can let the adjustment point be determined by POINTRAC 31.



### Setup - Relay

In this menu item you can select which mode the sensor should operate in.

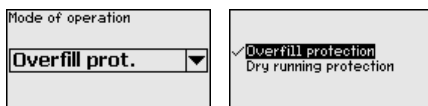
You can choose between overfill and dry run protection.

The relay outputs of the sensor react accordingly.

Overfill protection = the relay will deenergise (safe condition) when the max. level is reached.

Dry run protection = the relay will deenergise (safe condition) when the min. level is reached.

Make sure that you have selected the correct characteristics. See menu item "Setup/Current output mode".



### Lock setup - adjustment

With this menu item you safeguard the sensor parameters against unauthorized or unintentional modifications.

This menu item is described in the operating instructions manual "Display and adjustment module".

### Display

#### Display - Language

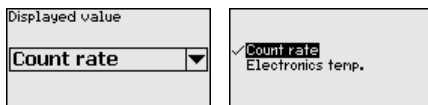
With this parameter you can change the display language.

This parameter is described in the operating instructions manual "Display and adjustment module".

#### Display/Displayed value

With this parameter you can change the indication of the display.

You can choose if the display should show the actual pulse rate or the electronics temperature.



### Diagnostics

#### Diagnostics - Device status

In this menu item, you can enquire the status of your sensor. In normal operation, the sensor displays the message "OK". In case of fault, you will find the corresponding fault code here.

This parameter is described in the operating instructions manual "Display and adjustment module".

#### Diagnosis - Peak value

The peak value function holds the max. and min. values during operation.

This parameter is described in the operating instructions manual "*Display and adjustment module*".

## Diagnosis - Adjustment data

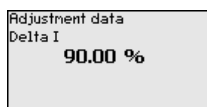
Here, you can retrieve the adjustment value of the sensor. This is the percentage value of the max. pulse rate at which the sensor switches over.

If you have carried out a single point adjustment, this is the entered value. With a two-point adjustment, this is the calculated value.

The value is an indication for the reliability and reproducibility of the switching point.

The greater the difference in the pulse rate between covered and uncovered status, the greater the differential value (Delta I) and the more reliable the measurement. The automatically calculated damping is also oriented around the Delta I value. The higher the value, the lower the damping.

A Delta I value below 10 % is an indication for a critical measurement.



## Diagnosis - Simulation

In this menu item you can simulate measured values via the current output. This allows the signal path to be tested, e.g. through downstream indicating instruments or the input card of the control system.

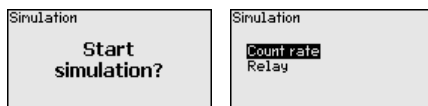


### Note:

To carry out a simulation with the display and adjustment module, you have to switch on the simulation switch on the electronics module (switch position 1).

You can find the rotary switch on the electronics module in the electronics and connection department (large cover).

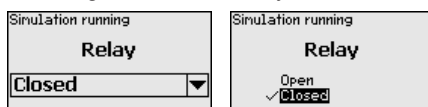
You can simulate different values:



Pulse rate of the sensor



Switching function of the relay



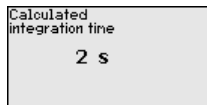


### Information:

10 minutes after the key was pressed for the last time, the simulation is interrupted automatically. You can also interrupt the simulation with the switch on the electronics module.

### Diagnosis - Calculated damping

The sensor calculates a suitable integration time automatically.



### Additional adjustments

#### Additional settings - PIN

In this menu item, the PIN is permanently activated/deactivated. Thus you protect the sensor data against unauthorized access and unintended changes. The default setting of the PIN is 0000.

This parameter is described in the operating instructions manual "*Display and adjustment module*".

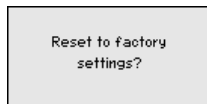
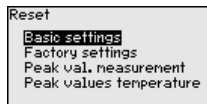
#### Additional adjustments - Date Time

In this menu item you can set the actual date and time.

This parameter is described in the operating instructions manual "*Display and adjustment module*".

#### Additional adjustments - Reset

When a reset is carried out, all settings (with only a few exceptions) are reset. The exceptions are: PIN, language, SIL and HART mode.



The following reset functions are available:

**Basic settings:** Resetting of the parameter adjustments to default values at the time of shipment. Order-specific settings are deleted.

**Default settings:** Resetting of the parameter adjustment like under "*Basic settings*". In addition, special parameters are reset to default values. Order-specific settings are deleted.

**Peak values of measured value:** Resetting of the parameter adjustments in the menu item "*Setup*" to the default values of the respective instrument. Order-specific settings remain but are not taken over into the current parameters.

**Peak values of temperature:** Resetting of the measured min. and max. temperatures to the actual measured value.

The following table shows the default values of the instrument. The values apply for the application "*Level*". First of all you have to select the application.

Depending on the instrument version, not all menu items may be available or they may be differently assigned:

| Menu    | Menu item              | Default value                               |
|---------|------------------------|---------------------------------------------|
| Setup   | Measurement loop name  | Sensor                                      |
|         | Isotope                | Cs-137                                      |
|         | Application            | Limit level                                 |
|         | Adjustment mode        | Single point adjustment                     |
|         | Adjustment - uncovered | 90000 ct/s                                  |
|         | Adjustment - covered   | 9000 ct/s<br>only with two-point adjustment |
|         | Delta I                | 90 %                                        |
|         | Background radiation   | 0 ct/s                                      |
|         | Temperature unit       | ° C                                         |
|         | Adjustment mode        | 1-point                                     |
|         | Adjustment uncovered   | 900000 ct/s                                 |
|         | Delta I                | 90 %                                        |
|         | Mode relay             | Overfill protection                         |
|         | Block adjustment       | Released                                    |
| Display | Language               | Selected language                           |
|         | Displayed value        | Pulse rate                                  |
|         | Display unit           | ct/s                                        |

### Additional adjustments - HART mode

With this function you can select the mode.

The sensor offers the HART modes standard and multidrop.

If the measured value is outputted via the 4 ... 20 mA output, you must not switch over to HART Multidrop.

The mode 'Standard', with fixed address 0 (factory setting), means output of the measured value as 8/16 mA signal.

This parameter is described in the operating instructions manual "*Display and adjustment module*".

### Additional adjustments - Copy instrument settings

With this function

- Load parameter adjustment data from the sensor into the display and adjustment module
- Write parameter adjustment data from the display and adjustment module into the sensor

This parameter is described in the operating instructions manual "*Display and adjustment module*".

### Info

### Info

In this menu you will find the following menu items:

- Instrument name - shows instrument name and serial number
- Instrument version - shows hardware and software version of the instrument

- Date of manufacture - shows calibration date and the date of the last change
- Device ID - shows the device ID and the sensor TAG (PD\_TAG)
- Instrument features - shows further instrument features

These parameters are described in the operating instructions manual "*Display and adjustment module*".

## 6.4 Saving the parameter adjustment data

We recommend noting the adjusted data, e.g. in this operating instructions manual, and archiving them afterwards. They are thus available for multiple use or service purposes.

If the instrument is equipped with a display and adjustment module, the data in the sensor can be saved in the display and adjustment module. The procedure is described in the operating instructions manual "*Display and adjustment module*" in the menu item "*Copy sensor data*". The data remain there permanently even if the sensor power supply fails.

The following data or settings for adjustment of the display and adjustment module are saved:

- All data of the menu "*Setup*" and "*Display*"
- In the menu "*Additional adjustments*" the items "*Sensor-specific units, temperature unit and linearization*"
- The values of the user programmable linearization curve

The function can also be used to transfer settings from one instrument to another instrument of the same type. If it is necessary to exchange a sensor, the display and adjustment module is inserted into the replacement instrument and the data are likewise written into the sensor via the menu item "*Copy sensor data*".

## 7 Setup with PACTware

### 7.1 Connect the PC

Via the interface adapter directly on the sensor

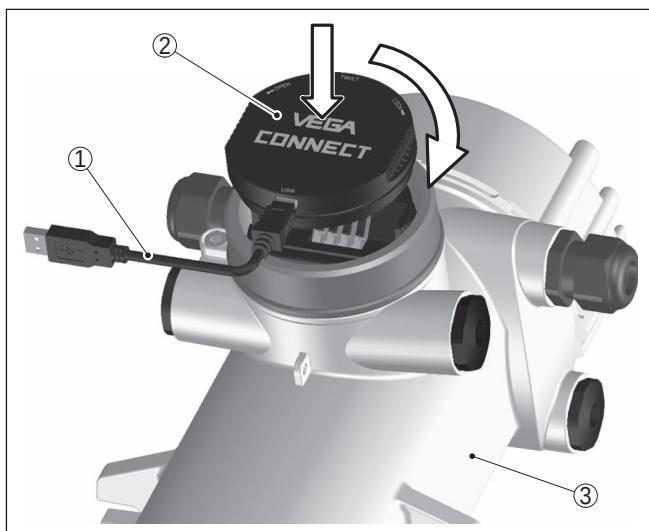


Fig. 14: Connection of the PC directly to the sensor via the interface adapter

- 1 USB cable to the PC
- 2 Interface adapter VEGACONNECT 4
- 3 "Sensor"



#### Information:

The interface adapter VEGACONNECT 3 is not suitable for connection to the sensor.

### 7.2 Parameter adjustment with PACTware

For parameter adjustment of the sensor via a Windows PC, the configuration software PACTware and a suitable instrument driver (DTM) according to FDT standard are required. The up-to-date PACTware version as well as all available DTMs are compiled in a DTM Collection. The DTMs can also be integrated into other frame applications according to FDT standard.



#### Note:

To ensure that all instrument functions are supported, you should always use the latest DTM Collection. Furthermore, not all described functions are included in older firmware versions. You can download the latest instrument software from our homepage. A description of the update procedure is also available in the Internet.

Further setup steps are described in the operating instructions manual "DTM Collection/PACTware" attached to each DTM Collection and which can also be downloaded from the Internet. Detailed descriptions are available in the online help of PACTware and the DTMs.

#### Prerequisites

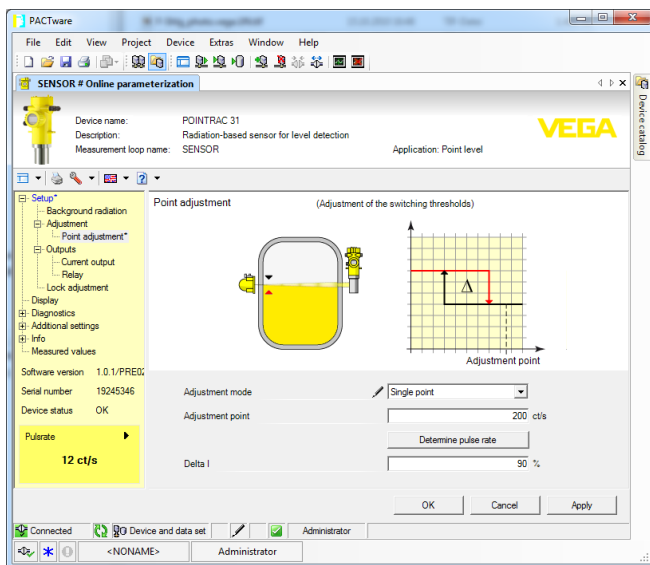


Fig. 15: Example of a DTM view

## Standard/Full version

All device DTMs are available as a free-of-charge standard version and as a full version that must be purchased. In the standard version, all functions for complete setup are already included. An assistant for simple project configuration simplifies the adjustment considerably. Saving/printing the project as well as import/export functions are also part of the standard version.

In the full version there is also an extended print function for complete project documentation as well as a save function for measured value and echo curves. In addition, there is a tank calculation program as well as a multiviewer for display and analysis of the saved measured value and echo curves.

The standard version is available as a download under [www.vega.com/downloads](http://www.vega.com/downloads) and "Software". The full version is available on CD from the agency serving you.

## 7.3 Saving the parameter adjustment data

We recommend documenting or saving the parameter adjustment data via PACTware. That way the data are available for multiple use or service purposes.

## 8 Set up with other systems

### 8.1 DD adjustment programs

Device descriptions as Enhanced Device Description (EDD) are available for DD adjustment programs such as, for example, AMS™ and PDM.

The files can be downloaded at [www.vega.com/downloads](http://www.vega.com/downloads) under "Software".

### 8.2 Field Communicator 375, 475

Device descriptions for the instrument are available as EDD for parameter adjustment with the Field Communicator 375 or 475.

For the integration of the EDD in the Field Communicator 375 or 475, the software "Easy Upgrade Utility" is required which is available from the manufacturer. This software is updated via the Internet and new EDDs are automatically taken over into the device catalogue of this software after they are released by the manufacturer. They can then be transferred to a Field Communicator.

## 9 Diagnostics and service

### 9.1 Maintenance

If the device is used correctly, no maintenance is required in normal operation.

The corresponding source container must be checked in regular intervals. You can find further information in the operating instructions manual of the source container.

### 9.2 Status messages

The instrument features self-monitoring and diagnostics according to NE 107 and VDI/VDE 2650. In addition to the status messages in the following tables there are more detailed error messages available under the menu item "Diagnostics" via the display and adjustment module, PACTware/DTM and EDD.

#### Status messages

The status messages are divided into the following categories:

- Failure
- Function check
- Out of specification
- Maintenance requirement

and explained by pictographs:

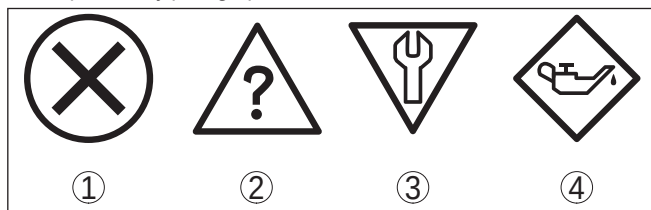


Fig. 16: Pictographs of the status messages

- 1 Failure - red
- 2 Out of specification - yellow
- 3 Function check - orange
- 4 Maintenance - blue

**Failure:** Due to a malfunction in the instrument, a failure message is outputted.

This status message is always active. It cannot be deactivated by the user.

**Function check:** The instrument is in operation, the measured value is temporarily invalid (for example during simulation).

This status message is inactive by default. It can be activated by the user via PACTware/DTM or EDD.

**Out of specification:** The measured value is unstable because the instrument specification is exceeded (e.g. electronics temperature).

This status message is inactive by default. It can be activated by the user via PACTware/DTM or EDD.

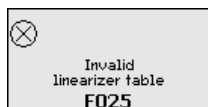
**Maintenance:** Due to external influences, the instrument function is limited. The measurement is affected, but the measured value is still valid. Plan in maintenance for the instrument because a failure is expected in the near future (e.g. due to buildup).

This status message is inactive by default. It can be activated by the user via PACTware/DTM or EDD.

## Failure

The following table shows the error codes and text messages in the status message "Failure" and provides information on causes as well as corrective measures.

Example for a failure message



| Code<br>Text message                     | Cause                                                                                                                                                               | Rectification                                                                                                                                                   |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| F008<br>Error multi sensor communication | <ul style="list-style-type: none"> <li>– Additional sensors not switched on</li> <li>– EMC influences</li> <li>– No other sensor available</li> </ul>               | <ul style="list-style-type: none"> <li>– Check wiring between the sensors</li> <li>– Connect the sensors correctly and make them ready for operation</li> </ul> |
| F013<br>Sensor signals a fault           | <ul style="list-style-type: none"> <li>– Error on the current input</li> <li>– No valid measured value</li> <li>– Connected instruments without function</li> </ul> | <ul style="list-style-type: none"> <li>– Check current input</li> <li>– Check connected instruments (Slaves)</li> </ul>                                         |
| F016<br>Adjustment data exchanged        | <ul style="list-style-type: none"> <li>– Values of the min. and max. adjustment exchanged</li> </ul>                                                                | <ul style="list-style-type: none"> <li>– Correct adjustment data</li> </ul>                                                                                     |
| F017<br>Adjustment span too small        | <ul style="list-style-type: none"> <li>– The values of the min. and max. adjustment are too close together</li> </ul>                                               | <ul style="list-style-type: none"> <li>– Correct adjustment data</li> </ul>                                                                                     |
| F025<br>Invalid linearization table      | <ul style="list-style-type: none"> <li>– Wrong value in the linearization table</li> </ul>                                                                          | <ul style="list-style-type: none"> <li>– Correct linearization table</li> </ul>                                                                                 |
| F030<br>Process value out of limits      | <ul style="list-style-type: none"> <li>– Process values are not within the adjusted measuring range</li> </ul>                                                      | <ul style="list-style-type: none"> <li>– Repeat adjustment</li> </ul>                                                                                           |
| F034<br>EPROM hardware error             | <ul style="list-style-type: none"> <li>– Electronics defective</li> </ul>                                                                                           | <ul style="list-style-type: none"> <li>– Exchanging the electronics</li> </ul>                                                                                  |
| F035<br>EPROM data error                 | <ul style="list-style-type: none"> <li>– Error in the internal instrument communication</li> </ul>                                                                  | <ul style="list-style-type: none"> <li>– Carry out a reset</li> <li>– Exchanging the electronics</li> </ul>                                                     |

| Code<br>Text mes-<br>sage                                                   | Cause                                                                                                        | Rectification                                                                                                                                    |
|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| F036<br>Faulty pro-<br>gram memory                                          | – Error during software<br>update                                                                            | – Repeat software update<br>– Exchanging the electronics                                                                                         |
| F037<br>RAM hard-<br>ware error                                             | – Error in RAM                                                                                               | – Exchanging the electronics                                                                                                                     |
| F038<br>Slave signals<br>failure                                            | – Connection cable to the<br>Slave instrument interrupted<br>– Instrument not defined as<br>Slave instrument | – Define instrument as Slave<br>– Check the connection cable<br>to the Slave instrument                                                          |
| F040<br>Hardware<br>error                                                   | – Sensor defective                                                                                           | – Exchanging the electronics                                                                                                                     |
| F041<br>Photomulti-<br>plier error                                          | – Error in the measured value<br>recording                                                                   | – Exchanging the electronics                                                                                                                     |
| F045<br>Error on the<br>current output                                      | – Error on the current output                                                                                | – Check wiring of the current<br>output<br>– Exchanging the electronics                                                                          |
| F052<br>Faulty config-<br>uration                                           | – Invalid parameter adjust-<br>ment                                                                          | – Carry out a reset                                                                                                                              |
| F114<br>Error real time<br>clock                                            | – Discharge accumulator                                                                                      | – Readjust real time clock                                                                                                                       |
| F122<br>Double ad-<br>dress on the<br>multisensor<br>communica-<br>tion bus | – Instrument addresse was<br>assigned several times                                                          | – Change instrument<br>addresses                                                                                                                 |
| F123<br>X-ray alarm                                                         | – External instruments cause<br>radioactive radiation                                                        | – Determine reason for X-ray<br>alarm<br>– In case of a brief X-ray<br>alarm, shut down the instru-<br>ment (switching) outputs for<br>this time |
| F124<br>Alarm due to<br>increased ra-<br>diation                            | – Radiation dose too high                                                                                    | – Determine reason for<br>increased radiation                                                                                                    |
| F125<br>Ambient tem-<br>perature too<br>high                                | – Ambient temperature on<br>the housing outside the<br>specification                                         | – Cool (heat) the instrument<br>or protect it with isolation<br>material against cold or<br>radiation heat                                       |

**Function check**

The following table shows the error codes and text messages in the status message "*Function check*" and provides information on causes as well as corrective measures.

| Code<br>Text mes-<br>sage | Cause               | Rectification                                                      |
|---------------------------|---------------------|--------------------------------------------------------------------|
| C029<br>Simulation        | – Simulation active | – Finish simulation<br>– Wait for the automatic end after 60 mins. |

**Out of specification**

The following table shows the error codes and text messages in the status message "*Out of specification*" and provides information on causes as well as corrective measures.

| Code<br>Text mes-<br>sage                    | Cause                                  | Rectification                                                             |
|----------------------------------------------|----------------------------------------|---------------------------------------------------------------------------|
| S017<br>Accuracy outside the specification   | – Accuracy outside the specification   | – Correct adjustment data                                                 |
| S025<br>Bad linearization table              | – Bad linearization table              | – Carry out linearization                                                 |
| S038<br>Slave outside the specification      | – Slave outside the specification      | – Check Slave                                                             |
| S125<br>Ambient temperature too high/too low | – Ambient temperature too high/too low | – Protect instrument with isolating material against extreme temperatures |

**Maintenance**

The instrument has no status messages to the section "*Maintenance*".

**9.3 Rectify faults****Reaction when malfunctions occur**

The operator of the system is responsible for taking suitable measures to rectify faults.

**Procedure for fault rectification**

The first measures are:

- Evaluation of fault messages via the indicating and adjustment module
- Checking the output signal
- Treatment of measurement errors

Further comprehensive diagnosis possibilities are offered by a PC with the software PACTware and suitable DTM.

In many case, the failure reasons can thus be determined and faults rectified.

## Check output signal

The following table describes possible faults that may not generate an error message:

| Error                                                                                                                               | Cause                                   | Rectification                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| The instrument signals covered without covering with the medium<br><br>The instrument signals covered with covering with the medium | Voltage supply missing                  | Check cables for breaks; repair if necessary                                                                                               |
|                                                                                                                                     | Operating voltage too low               | Check, adapt if necessary                                                                                                                  |
|                                                                                                                                     | Electrical connection faulty            | Check connection according to chapter " <i>Connection steps</i> " and if necessary, correct according to chapter " <i>Wiring plan</i> "    |
|                                                                                                                                     | Electronics defective                   | Change the switching behaviour of the sensors under "Diagnosis/Simulation". If the instrument does not switch over, send it in for repair. |
|                                                                                                                                     | Buildup on the inner wall of the vessel | Remove buildup<br>Check the Delta I value.<br>Improve the switching threshold - carry out a double point adjustment                        |

## Reaction after fault rectification

Depending on the reason for the fault and the measures taken, the steps described in chapter "*Setup*" must be carried out again or must be checked for plausibility and completeness.

## 24 hour service hotline

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is also available outside normal working hours, seven days a week around the clock.

Since we offer this service worldwide, the support is provided in English. The service itself is free of charge, the only costs involved are the normal call charges.

## 9.4 Exchanging the electronics module

If the electronics module is defective, it can be replaced by the user.



In Ex applications, only instruments and electronics modules with appropriate Ex approval may be used.

If there is no electronics module available on site, the electronics module can be ordered through the agency serving you. The electronics modules are adapted to the respective sensor and differ in signal output or voltage supply.

The new electronics module must be loaded with the default settings of the sensor. These are the options:

- In the factory
- Or on site by the user

In both cases, the serial number of the sensor is needed. The serial numbers are stated on the type label of the instrument, on the inside of the housing as well as on the delivery note.

When loading on site, first of all the order data must be downloaded from the Internet (see operating instructions manual "*Electronics module*").

## 9.5 Software update

The following components are required to update the sensor software:

- Sensor
- Voltage supply
- Interface adapter VEGACONNECT
- PC with PACTware
- Current sensor software as file

You can find the actual sensor software as well as detailed information of the procedure under "[www.vega.com/downloads](http://www.vega.com/downloads)" and "*Software*".

You can find information about the installation in the download file.



### Caution:

Instruments with approvals can be bound to certain software versions. Therefore make sure that the approval remains effective with a software update.

You can find detailed information on [www.vega.com/downloads](http://www.vega.com/downloads) and "*Approvals*".

## 9.6 How to proceed in case of repair

The following procedure refers only to the sensor. Should a repair of the source container be necessary, you can find the respective instructions in the operating instructions manual of the source container.

You can find a repair form as well as detailed information on how to proceed under [www.vega.com/downloads](http://www.vega.com/downloads) and "*Forms and certificates*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

If a repair is necessary, please proceed as follows:

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please contact the agency serving you to get the address for the return shipment. You can find the agency on our home page [www.vega.com](http://www.vega.com).

## 10 Dismounting

### 10.1 Dismounting steps

**Warning:**

Before dismounting, be aware of dangerous process conditions such as e.g. pressure in the vessel or pipeline, high temperatures, corrosive or toxic products etc.

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

### 10.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the parts to be easily separable.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

**WEEE directive 2002/96/EG**

This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

11 Supplement

11.1 Technical data

General data

|                                                                     |                                                                                 |
|---------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 316L corresponds to 1.4404 or 1.4435                                |                                                                                 |
| Materials, non-wetted parts                                         |                                                                                 |
| – Detector tube                                                     | 316L                                                                            |
| – Scintillation material                                            | PVT (Polyvinyltoluene)                                                          |
| – Aluminium die-casting housing                                     | Aluminium die-casting AlSi10Mg, powder-coated - basis: Polyester                |
| – Stainless steel housing                                           | 316L                                                                            |
| – Seal between housing and housing cover                            | NBR (stainless steel housing, investment casting), silicone (Aluminium housing) |
| – Inspection window in housing cover (optional)                     | Polycarbonate                                                                   |
| – Ground terminal                                                   | 316L                                                                            |
| – Mounting accessory                                                | 316L                                                                            |
| Process fittings                                                    |                                                                                 |
| – Fastening lugs                                                    | ø 9 mm (0.35 in), hole centre distance 119 mm (4.69 in)                         |
| Weight                                                              |                                                                                 |
| – Aluminium housing, with electronics                               | 3.4 kg (7.5 lbs) + measuring length                                             |
| – Stainless steel housing, with electronics                         | 8.36 kg (18.43 lbs) + measuring length                                          |
| – Measuring length 152 mm (6 in)                                    | 0.98 kg (2.16 lbs)                                                              |
| – Measuring length 304 mm (12 in)                                   | 1.95 kg (4.3 lbs)                                                               |
| Max. torque, mounting screws - fastening lugs on the sensor housing |                                                                                 |
| Max. torque for NPT cable glands and Conduit tubes                  |                                                                                 |
| – Aluminium/Stainless steel housing                                 | 50 Nm (36.88 lbf ft)                                                            |

Input variable

|                   |                                                                                                                                                                                            |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measured variable | The measured variable is the intensity of the gamma radiation. When the intensity of the radiation is below the stipulated value due to a damping by the medium, the POINTRAC 31 switches. |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

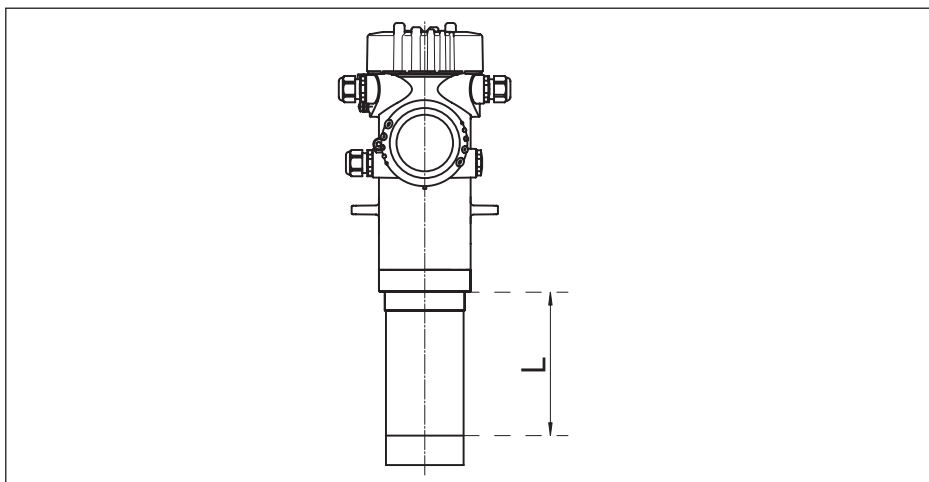


Fig. 17: Data of the input variable

*L* Measuring range (range in which the switching point must lie)

Measuring range 152 mm (6 in) or 304 mm (12 in)

Analogue input

- Input type 4 ... 20 mA, passive
- Internal load 250  $\Omega$

Switching input

- Type of input - Open Collector 10 mA
- Type of input - Relay contact 100 mA

### Output variable

Output

- Signal digital output signal, Foundation Fieldbus protocol
- Physical layer according to IEC 61158-2

Damping (63 % of the input variable) 0 ... 999 s, adjustable

Channel Numbers

- Channel 1 Process value (switching status)
- Channel 8 Electronics temperature
- Channel 9 Pulse rate

Transmission rate 31.25 Kbit/s

Current value 10 mA,  $\pm 0.5$  mA

Resolution, digital > 0.1 mm (0.004 in)

### Relay output

Output Relay output (SPDT), floating spdt

- Switching voltage 10 mV

|                                   |                                                                                                                                                                                                                          |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – Max.                            | 253 V AC, 253 V DC                                                                                                                                                                                                       |
| Switching current                 |                                                                                                                                                                                                                          |
| – Min.                            | 10 $\mu$ A                                                                                                                                                                                                               |
| – Max.                            | 3 A AC, 1 A DC                                                                                                                                                                                                           |
| Breaking capacity                 |                                                                                                                                                                                                                          |
| – Min.                            | 50 mW                                                                                                                                                                                                                    |
| – Max.                            | 750 VA AC, 40 W DC                                                                                                                                                                                                       |
|                                   | If inductive loads or stronger currents are switched through, the gold plating on the relay contact surface will be permanently damaged. The contact is then no longer suitable for switching low-level signal circuits. |
| Contact material (relay contacts) | AgNi or AgSnO and Au plated                                                                                                                                                                                              |

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**Transistor output**


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|                   |                                                            |
|-------------------|------------------------------------------------------------|
| Output            | Floating transistor output, permanently shortcircuit-proof |
| Load current      | < 400 mA                                                   |
| Voltage loss      | < 1 V                                                      |
| Switching voltage | < 55 V DC                                                  |
| Blocking current  | < 10 $\mu$ A                                               |

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**Accuracy (according to DIN EN 60770-1)**


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Process reference conditions according to DIN EN 61298-1

|                               |                                                                                                       |
|-------------------------------|-------------------------------------------------------------------------------------------------------|
| – Temperature                 | +18 ... +30 °C (+64 ... +86 °F)                                                                       |
| – Relative humidity           | 45 ... 75 %                                                                                           |
| – Air pressure                | 860 ... 1060 mbar/86 ... 106 kPa (12.5 ... 15.4 psig)                                                 |
| Repeatability                 | $\leq$ 0.5 %                                                                                          |
| Deviation with bulk solids    | The values depend to a great extent on the application. Binding specifications are thus not possible. |
| Deviation under EMC influence | $\leq$ 1 %                                                                                            |

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**Ambient conditions**


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Ambient, storage and transport temperature -40 ... +60 °C (-40 ... +140 °F)

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**Process conditions**


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For the process conditions, please also note the specifications on the type label. The lower value always applies.

|                                                     |                                                                                                                |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Process pressure                                    | Unpressurized                                                                                                  |
| Process temperature (measured on the detector tube) | -40 ... +60 °C (-40 ... +140 °F)<br>With temperatures of more than 60 °C we recommend the use of water cooling |
| Vibration resistance <sup>3)</sup>                  | mechanical vibrations up to 1 g in the frequency range 5 ... 200 Hz                                            |

<sup>3)</sup> Tested according to the guidelines of German Lloyd, GL directive 2.

## Electromechanical data - version IP 66/IP 67

### Cable entry

- M20 x 1.5 2 x cable gland M20 x 1.5 (cable: ø 6 ... 12 mm), 4 x blind plug M20 x 1.5  
Included: 1 x cable gland M20 x 1.5
- ½ NPT 5 x closing cap (red) ½ NPT  
Included: 3 x cable gland ½ NPT (cable: ø 6 ... 12 mm), 4 x blind plug ½ NPT

### Spring-loaded terminals for wire cross-section

- Massive wire, cord 0.2 ... 2.5 mm<sup>2</sup> (AWG 24 ... 14)
- Stranded wire with end sleeve 0.2 ... 1.5 mm<sup>2</sup> (AWG 24 ... 16)

## Display and adjustment module

Display element Display with backlight

### Measured value indication

- Number of digits 5
- Size of digits W x H = 7 x 13 mm

Adjustment elements 4 keys

### Protection rating

- unassembled IP 20
- mounted into the housing without cover IP 40

### Materials

- Housing ABS
- Inspection window Polyester foil

## Integrated clock

Date format Day.Month.Year

Time format 12 h/24 h

Time zone Ex factory CET

Rate deviation max. 10.5 min/year

## Measurement electronics temperature

Resolution 1 °C (1.8 °F)

Accuracy ±1 °C (1.8 °F)

## Voltage supply

### Operating voltage

- Sensor power supply 20 ... 72 V DC or 20 ... 253 V AC, 50/60 Hz
- FF bus 9 ... 32 V DC

## Electrical protective measures

|                                          |                           |
|------------------------------------------|---------------------------|
| Protection, depending on housing version | IP 66/IP 67 <sup>4)</sup> |
| Overvoltage category                     | III                       |
| Protection class                         | I                         |

## Approvals

Instruments with approvals can have different technical data depending on the version.

For that reason the associated approval documents of these instruments must be carefully noted. They are part of the delivery or can be downloaded under [www.vega.com](http://www.vega.com) and "VEGA Tools" as well as under "Downloads" and "Approvals".

## 11.2 Supplementary information Foundation Fieldbus

The following table gives you an overview of the instrument versions and the corresponding device descriptions, the electrical characteristics of the bus system as well as the applied function blocks.

|                             |                                        |                                               |
|-----------------------------|----------------------------------------|-----------------------------------------------|
| Revisions Data              | DD-Revision                            | Rev_01                                        |
|                             | CFF-File                               | 010101.cff                                    |
|                             | Device Revision                        | 0101.ffo<br>0101.sym                          |
|                             | Cff-Revision                           | xx xx 01                                      |
|                             | Device software revision               | > 1.5.0                                       |
|                             | ITK (Interoperability Test Kit) Number | 6.0.1                                         |
| Electrical Characteristics  | Physical Layer Type                    | Low-power signaling, bus-powered, FISCO I.S.  |
|                             | Input Impedance                        | > 3000 Ohms between 7.8 KHz - 39 KHz          |
|                             | Unbalanced Capacitance                 | < 250 pF to ground from either input terminal |
|                             | Output Amplitude                       | 0.8 V P-P                                     |
|                             | Electrical Connection                  | 4 Wire                                        |
|                             | Polarity Insensitive                   | Yes                                           |
|                             | Max. Current Load                      | 10 mA                                         |
|                             | Device minimum operating voltage       | 9 V                                           |
| Transmitter Function Blocks | Resource Block (RB)                    | 1                                             |
|                             | Transducer Block (TB)                  | 1                                             |
|                             | Standard Block (AI)                    | 3                                             |
|                             | Execution Time                         | 30 ms                                         |
| Diagnostics                 | Standard                               | Yes                                           |
|                             | Advanced                               | Yes                                           |
|                             | Performance                            | No                                            |
|                             | Function Blocks Instantiable           | No                                            |

<sup>4)</sup> A suitable cable is the prerequisite for maintaining the protection rating.

|                     |                                                      |    |
|---------------------|------------------------------------------------------|----|
| General Information | LAS (Link Active Scheduler)                          | No |
|                     | Master Capable                                       | No |
|                     | Number of VCRs (Virtual Communication Relationships) | 24 |

### Function block Analog Input (AI)

The function block "Analog Input (AI)" takes the original measured value selected by a Channel Number and makes it available to additional function blocks on its output.

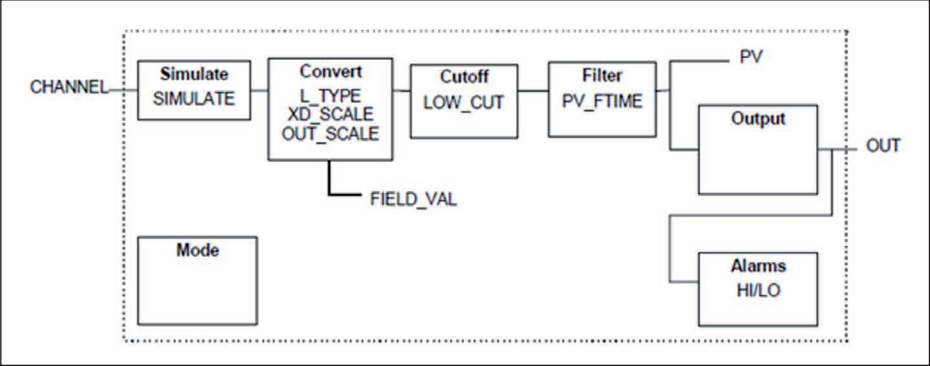


Fig. 18: Schematic presentation function block Analog Input (AI)

### Parameter list

The following table gives you an overview of the parameters used.

| FF descriptor               | Rel. Index | Description                                                                                                                                                                                 | Unit                        |
|-----------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| PRIMARY_VALUE               | 13         | PRIMARY_VALUE (Linearized value). This is the process value after min/max adjustment and Linearization with the status of the transducer block. The unit is defined in "PRIMARY_VALUE_UNIT" | FF_PRIMARY_VALUE_UNIT       |
| FF_PRIMARY_VALUE_UNIT       | 14         | Selected unit code for "PRIMARY_VALUE"                                                                                                                                                      | -                           |
| FF_VAPOR_DENSITY            | 15         | Density with Temperature correction                                                                                                                                                         | FF_VAPOR_DENSITY_UNIT       |
| FF_VAPOR_DENSITY_UNIT       | 16         | Selected unit code for "FF_VAPOR_DENSITY"                                                                                                                                                   | -                           |
| FF_PROCESS_TEMPERATURE      | 17         | Process temperature                                                                                                                                                                         | FF_PROCESS_TEMPERATURE_UNIT |
| FF_PROCESS_TEMPERATURE_UNIT | 18         | Selected unit code for "FF_PROCESS_TEMPERATURE"                                                                                                                                             | -                           |
| FF_DENSITY                  | 19         | Density                                                                                                                                                                                     | FF_DENSITY_UNIT             |
| FF_DENSITY_UNIT             | 20         | Selected unit code for "FF_DENSITY"                                                                                                                                                         | -                           |
| FF_VOLUMETRIC_FLOW          | 21         | Volumetric flow                                                                                                                                                                             | FF_VOLUMETRIC_FLOW_UNIT     |

| FF descriptor                  | Rel. Index | Description                                        | Unit                           |
|--------------------------------|------------|----------------------------------------------------|--------------------------------|
| FF_VOLUMETRIC_FLOW_UNIT        | 22         | Selected unit code for "FF_VOLUMETRIC_FLOW"        | -                              |
| FF_WEIGHT                      | 23         | Weight on belt                                     | FF_WEIGHT_UNIT                 |
| FF_WEIGHT_UNIT                 | 24         | Selected unit code for "FF_WEIGHT"                 | -                              |
| FF_BELT_SPEED                  | 25         | Belt speed                                         | FF_BELT_SPEED_UNIT             |
| FF_BELT_SPEED_UNIT             | 26         | Selected unit code for "FF_BELT_SPEED"             | -                              |
| FF_ELECTRONIC_TEMPERATURE      | 27         | Electronics temperature                            | FF_ELECTRONIC_TEMPERATURE_UNIT |
| FF_ELECTRONIC_TEMPERATURE_UNIT | 28         | Selected unit code for "FF_ELECTRONIC_TEMPERATURE" | -                              |
| FF_COUNT_RATE                  | 29         | Count rate                                         | FF_COUNT_RATE_UNIT             |
| FF_COUNT_RATE_UNIT             | 30         | Selected unit code for "FF_COUNT_RATE"             | -                              |
| DEVICE_TAG                     | 31         | Tagname                                            | -                              |
| DEVICE_NAME                    | 32         | Device type                                        | -                              |
| DEVICE_STATE                   | 33         | Error code                                         | -                              |
| PEAK_MEAS_VAL_MIN              | 34         | Pulse rate (min.)                                  | -                              |
| PEAK_MEAS_VAL_MAX              | 35         | Pulse rate (max.)                                  | -                              |
| PEAK_TEMP_VAL_MIN              | 36         | Electronics temperature (min.)                     | -                              |
| PEAK_TEMP_VAL_MAX              | 37         | Electronics temperature (max.)                     | -                              |
| APPLICATION_TYPE_SEL           | 38         | Selected application                               | -                              |
| TEMP_COMP_UNIT                 | 39         | Selected unit code for process temperature         | -                              |
| DELTA_I                        | 40         | Calculated percent delta I                         | -                              |
| GAUGE_TEMPERATURE              | 41         | Electronics temperature                            | -                              |
| DECAY_COMPENSATION_FACTOR      | 42         | Factor for the decay compensation                  | -                              |
| PMT_VOLTAGE_CALIBRATION        | 43         | Photomultiplier voltage on delivery                | -                              |
| CORRELATION_COEFF              | 44         | Correlation coefficient for linearizer table       | -                              |
| ERROR_TEXT                     | 45         | Error text                                         | -                              |
| PMT_VOLTAGE_ACTUAL             | 46         | Current photomultiplier voltage                    | -                              |
| STANDARDIZATION_FACTOR         | 47         | Factor for the real value correction               | -                              |
| SERIALNUMBER                   | 48         | Serial number                                      | -                              |

| FF descriptor           | Rel. Index | Description                             | Unit |
|-------------------------|------------|-----------------------------------------|------|
| NAMUR_STATE             | 49         | NAMUR state                             | -    |
| NULL_COUNT_RATE         | 50         | Zero count rate                         | -    |
| COUNT_RATE_PMT          | 51         | Pulse rate photomultiplier (raw values) | -    |
| ADJ_DENSITY_ABS_COEFF   | 52         | Process absorption coefficient          | -    |
| DEV_SW_VER_ASCII        | 53         | Software version                        | -    |
| POINT_LEVEL_ADJUST_MODE | 54         | Point level adjustment mode             | -    |
| RELAY_VALUE_SEL         | 55         | Relay basic value                       | -    |
| DIGITAL_IN              | 56         | Frequency of digital input              | -    |
| DIGITAL_IN_BOOL         | 57         | State of digital input                  | -    |
| ANALOG_IN               | 58         | Current on analog input                 | -    |
| FF_CHANNEL_AVAILABLE    | 59         | Available channels                      | -    |
| FF_CHANNEL_USED         | 60         | Used channels                           | -    |

## Mapping of Process Value Status

| Hex  | Quality   | Sub-Status          | Condition                                                                                                                                                                             |
|------|-----------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0x00 | Bad       | Non-specific        | Unexpected error                                                                                                                                                                      |
| 0x01 | Bad       | Configuration Error | It was tried to set a wrong unit with FF interface<br>On user error codes: 16, 17, 25, 52, 57, 66, 72, 117, 120                                                                       |
| 0x0C | Bad       | Device Failure      | Five or more internal communications have failed while "Process Data Update". Last usable value is displayed<br>On user error codes: 8, 34, 35, 36, 37, 38, 73, 80, 86, 121, 122, 141 |
| 0x10 | Bad       | Sensor Failure      | On user error codes: 40, 41, 53, 68, 123, 124, 125                                                                                                                                    |
| 0x1C | Bad       | Out of Service      | Transducer block is in mode "Out of Service"<br>Channel is not assigned to an AIFB<br>Channel is not available in running application                                                 |
| 0x20 | Bad       | Transducer in MAN   | Transducer block is in mode "Manual"                                                                                                                                                  |
| 0x44 | Uncertain | Last Usable Value   | Three or more internal communications have failed while "Process Data Update". Last usable value is displayed                                                                         |
| 0x48 | Uncertain | Substitute          | On user error codes: 29                                                                                                                                                               |
| 0x4C | Uncertain | Initial Value       | After startup of device or channel assignment in AIFB was changed. The channel unit may be unknown until next "Process Data Update"<br>On user error codes: 13                        |
| 0x80 | Good (NC) | Non-specific        | No errors concerning to channel handling<br>On user error codes: 0, 33, 45, 71, 126, 127                                                                                              |

## Mapping of User Error Codes to FF Field Diagnostics

| Priority      | Description                      | User Error Codes                     | NE-107 Status  |
|---------------|----------------------------------|--------------------------------------|----------------|
| 31            | Hardware failure                 | 40, 41                               | FAILURE        |
| 30            | Memory failure                   | 34, 35, 36, 37                       | FAILURE        |
| 29            | Software failure                 | 80                                   | FAILURE        |
| 28            | Paramerization corrupt           | 72                                   | FAILURE        |
| 27            | Undefined 27                     | -                                    | -              |
| 26            | Undefined 26                     | -                                    | -              |
| 25            | Paramerization error             | 16, 17, 25, 52, 53, 57, 66, 117, 120 | FAILURE        |
| 24            | Conflict in MGC                  | 121, 122, 141                        | FAILURE        |
| 23            | Communication error in MGC       | 8                                    | FAILURE        |
| 22            | MGC slave reports error          | 38                                   | FAILURE        |
| 21            | Undefined 21                     | -                                    | -              |
| 20            | Undefined 20                     | -                                    | -              |
| 19            | Undefined 19                     | -                                    | -              |
| 18            | Detector temperature critical    | 125                                  | OUT_OF_SPEC    |
| 17            | Error while auto-standardization | 73                                   | FAILURE        |
| 16            | Excessive radiation              | 123, 124                             | FAILURE        |
| 15            | Input out of bounds              | 13                                   | OUT_OF_SPEC    |
| 14            | Error while signal processing    | 68                                   | FAILURE        |
| 13            | Undefined 13                     | -                                    | -              |
| 12            | Undefined 12                     | -                                    | -              |
| 11            | Undefined 11                     | -                                    | -              |
| 10            | Undefined 10                     | -                                    | -              |
| 9             | Undefined 9                      | -                                    | -              |
| 8             | Undefined 8                      | -                                    | -              |
| 7             | AITB simulated                   | 29                                   | FUNCTION_CHECK |
| 6             | Undefined 6                      | -                                    | -              |
| 5             | Undefined 5                      | -                                    | -              |
| 4             | Undefined 4                      | -                                    | -              |
| 3             | Undefined 3                      | -                                    | -              |
| 2             | Undefined 2                      | -                                    | -              |
| 1             | Error while trend recording      | 126, 127                             | GOOD           |
| 0             | Reserved                         | -                                    | Reserved       |
| Not displayed |                                  | 33, 45, 71, 86                       | -              |

### 11.3 Dimensions

The following dimensional drawings represent only an extract of all possible versions. Detailed dimensional drawings can be downloaded at [www.vega.com/downloads](http://www.vega.com/downloads) under "Drawings".

# Aluminium and stainless steel housing

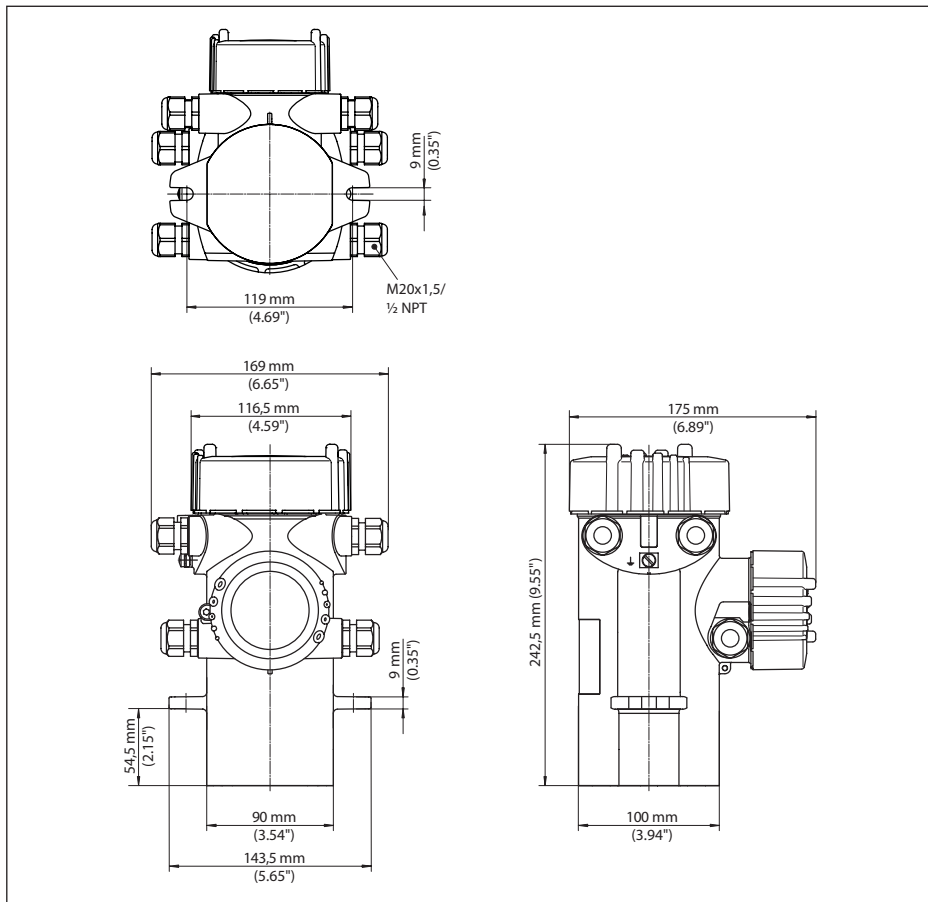


Fig. 19: Aluminium housing or stainless steel housing - Precision casting

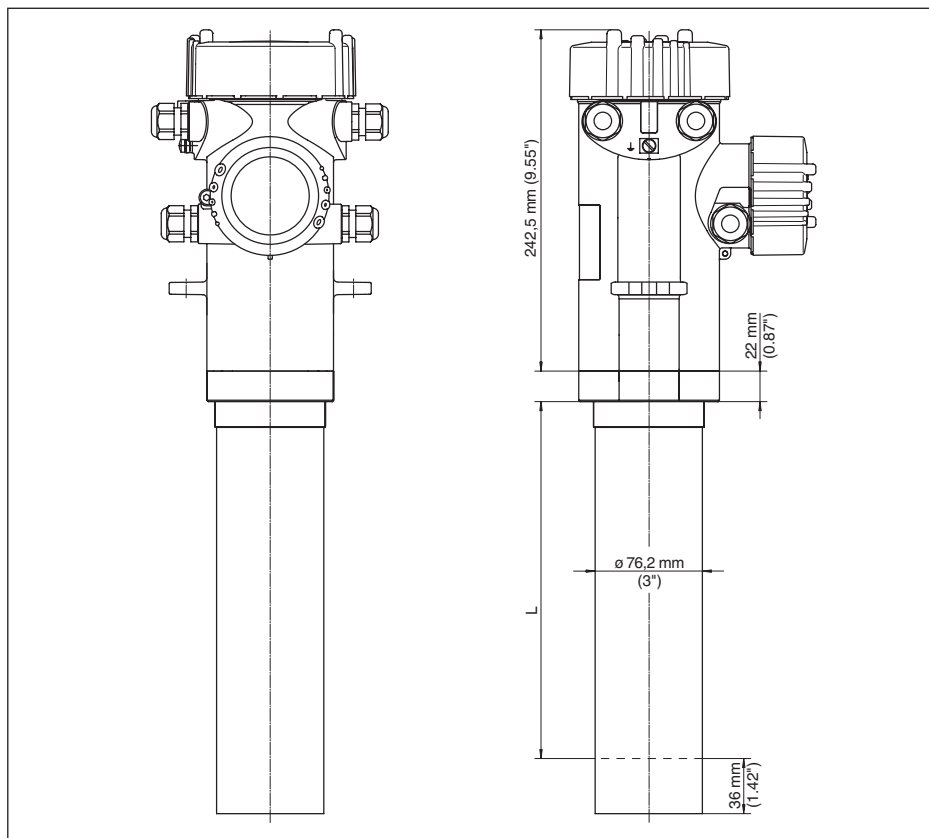
**POINTRAC 31**

Fig. 20: POINTRAC 31

L Measuring range = Order length 152 mm or 304 mm (6 in/12 in)

# POINTRAC 31 - Mounting example

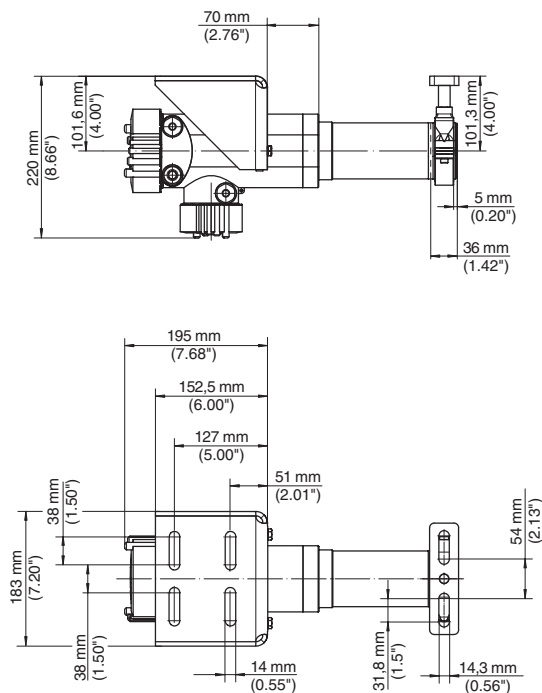


Fig. 21: POINTRAC 31 with supplied mounting accessories

## 11.4 Industrial property rights

VEGA product lines are global protected by industrial property rights. Further information see [www.vega.com](http://www.vega.com).

Only in U.S.A.: Further information see patent label at the sensor housing.

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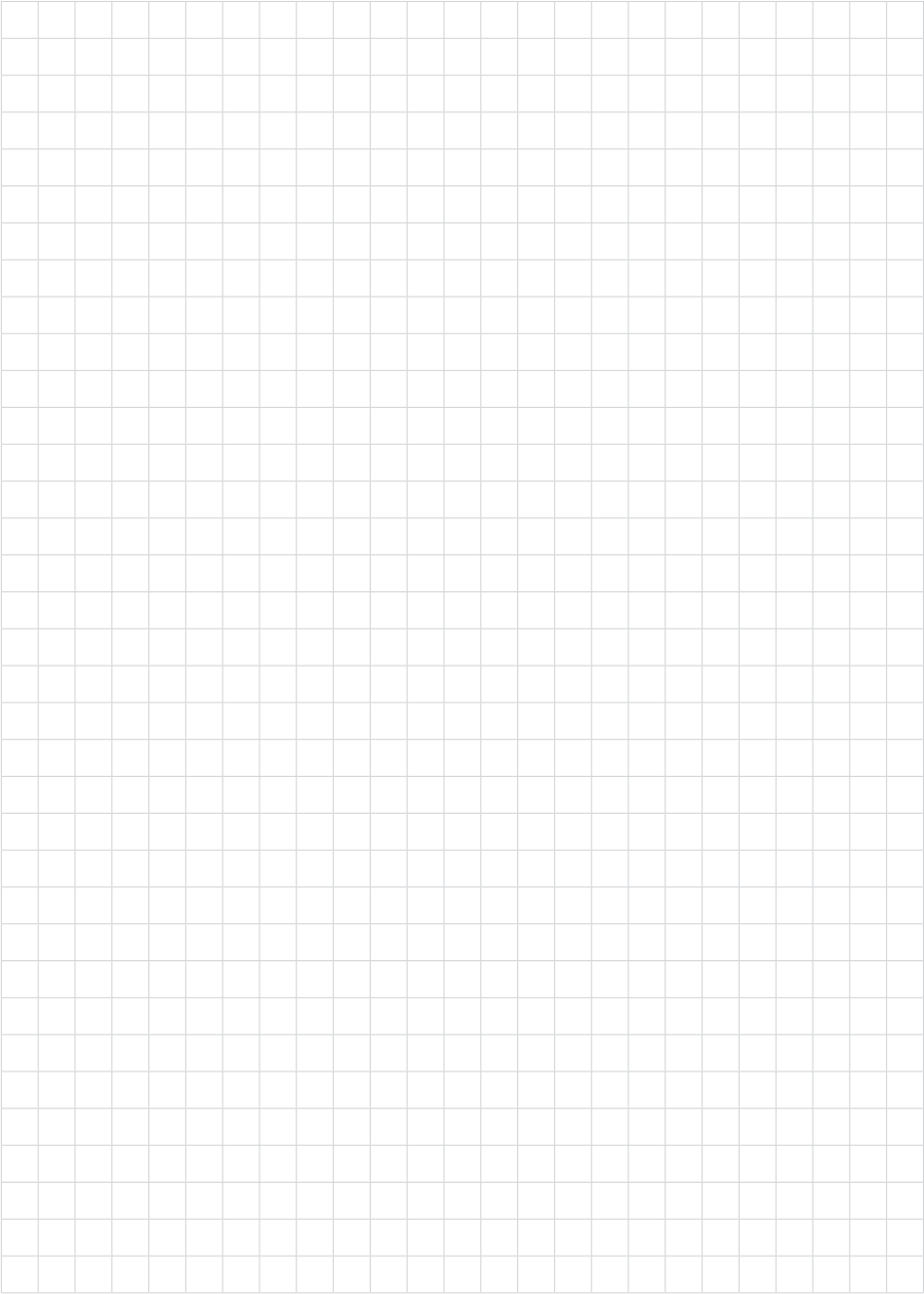
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Printing date:

# VEGA

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41779-EN-131119

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